

CLAIMS

What is claimed is:

1. An apparatus for coupling a paintball hopper to a paintball marker, comprising:
a marker mount, having a first end, a second end, an axial passage open at said first and said second ends, and a plurality of bores drilled perpendicular to the axis between said first and second end, said first end adapted to connect to a paintball marker,
a feed neck, having a third end, a fourth end, an axial passage open at said third and said fourth ends, and a plurality of cavities, said third end adapted to slidably enter said second end, wherein said cavities are adapted to align with said bores, a plurality of spheres, each of said spheres slidably mounted in said bores, and adapted to protrude out said bores,
a retaining sleeve, biased in a locked position and movable to an unlocked position, wherein said spheres are forced into said cavities if said cavities align with said bores and said retaining sleeve is in the locked position.
2. The apparatus as defined in claim 1, wherein said feed neck is held immobile if said bores align with said cavities and said retaining sleeve is in the locked position.
3. The apparatus as defined in claim 2, wherein the number of positions where said feed neck is held immobile is limited to the positions where said bores align with said cavities.

4. The apparatus as defined in claim 3, additionally comprising a circumferential ledge in each of said bores; whereby, said ledge keeps said sphere in said bore if said feed neck is removed from said marker mount.
5. The apparatus as defined in claim 4, wherein said feed neck axial passage is at most 1360/1000 of an inch in diameter.
6. The apparatus as defined in claim 5, wherein said marker mount axial passage is at least 680/1000 of an inch in diameter.
7. The apparatus as defined in claim 6, wherein said retaining sleeve moves axially between the locked and unlocked positions.
8. The apparatus as defined in claim 7, additionally comprising a circumferential ramp wherein said ramp applies force to said spheres if said feed neck is inserted in said marker mount, said bores are aligned with said cavities, and said retaining sleeve is in the locked position.
9. The apparatus as defined in claim 6, wherein said retaining sleeve moves rotationally between the locked and unlocked positions.
10. The apparatus as defined in claim 9, additionally comprising a plurality of ramps wherein each ramp applies force to each of said spheres if said feed neck is inserted in said marker mount, said bores are aligned with said cavities, and said retaining sleeve is in the locked position.
11. A paintball marker system, comprising:
 - a paintball hopper,
 - a paintball marker,

a coupler having an open passage, said coupler releaseably couples said paintball hopper to said paintball marker wherein paintballs pass from said hopper through said open passage into said paintball marker.

12. The apparatus as defined in claim 11, wherein said coupler additionally comprising a feed neck adapted to connect to said paintball hopper, a marker mount adapted to connect to said paintball marker, a retaining sleeve slidably mounted around said marker mount, said retaining sleeve biased in a locked position and moveable to an unlocked position, said feed neck releaseably couples to said marker mount.
13. The apparatus as defined in claim 12, wherein said open passage is at most 1360/1000 of an inch in diameter.
14. The apparatus as defined in claim 13, wherein said open passage is at least 680/1000 of an inch in diameter.
15. The apparatus as defined in claim 12, additionally comprising a plurality of cavities in said feed neck, a plurality of bores in said marker mount, said bores adapted to align to said cavities, a plurality of spheres one placed in each bore, wherein said spheres are forced into said cavities if said feed neck is inserted into said marker mount, said cavities are aligned with said bores, and said retaining sleeve moves to the locked position; thereby holding said paintball hopper immobile.
16. The apparatus as defined in claim 15, wherein the number of positions where said paintball hopper is held immobile is limited to the positions where said bores align with said cavities.

17. The apparatus as defined in claim 16, wherein said retaining sleeve moves axially between the locked and unlocked positions.
18. The apparatus as defined in claim 17, additionally comprising a circumferential ramp wherein said ramp applies force to said spheres if said feed neck is inserted in said marker mount, said bores are aligned with said cavities, and said retaining sleeve is in the locked position.
19. The apparatus as defined in claim 18, wherein said feed neck is held immobile if said bores align with said cavities and said retaining sleeve is in the locked position.
20. The apparatus as defined in claim 19, additionally comprising a circumferential ledge in each of said bores; whereby, said ledge keeps said sphere in said bore if said feed neck is removed from said marker mount.
21. The apparatus as defined in claim 20, wherein said feed neck axial passage is at most 1360/1000 of an inch in diameter.
22. The apparatus as defined in claim 21, wherein said marker mount axial passage is at least 680/1000 of an inch in diameter.
23. The apparatus as defined in claim 16, wherein said retaining sleeve moves rotationally between the locked and unlocked positions.
24. The apparatus as defined in claim 23, additionally comprising a plurality of ramps wherein each ramp applies force to each of said spheres if said feed neck is inserted in said marker mount, said bores are aligned with said cavities, and said retaining sleeve is in the locked position.

25. The apparatus as defined in claim 24, wherein said feed neck is held immobile if said bores align with said cavities and said retaining sleeve is in the locked position.
26. The apparatus as defined in claim 25, additionally comprising a circumferential ledge in each of said bores; whereby, said ledge keeps said sphere in said bore if said feed neck is removed from said marker mount.
27. The apparatus as defined in claim 26, wherein said feed neck axial passage is at most 1360/1000 of an inch in diameter.
28. The apparatus as defined in claim 27, wherein said marker mount axial passage is at least 680/1000 of an inch in diameter.
29. The apparatus as defined in claim 11, wherein said coupler additionally comprising a feed neck adapted to connect to said paintball hopper, a marker mount adapted to connect to said paintball marker, said feed neck releaseably couples to said marker mount.
30. The apparatus as defined in claim 29, additionally comprising a plurality of pins extending from said feed neck, a plurality of grooves in said marker mount adapted to align to each of said pins said grooves having a locking portion, and an o-ring and wave spring for holding each of said pins in said locking portions if each pin is positioned in a locking portion.
31. The apparatus as defined in claim 30, wherein the number of positions where said paintball hopper is held immobile is limited to the positions where said pins align with said grooves.
32. The apparatus as defined in claim 31, wherein said open passage is at most 1360/1000 of an inch in diameter.

33. The apparatus as defined in claim 32, wherein said open passage is at least 680/1000 of an inch in diameter.
34. A paintball marker system, comprising:
a paintball hopper,
a paintball marker,
a means for releaseably coupling said paintball hopper to said paintball marker wherein paintballs pass from said paintball hopper into said paintball marker.
35. The apparatus as defined in claim 34, wherein said means for coupling comprises a feed neck adapted to connect to said paintball hopper, a marker mount adapted to connect to said paintball marker, a retaining sleeve slidably mounted around said marker mount, said retaining sleeve biased in a locked position and moveable to an unlocked position, said feed neck releaseably couples to said marker mount, and means for holding said feed neck immobile if said feed neck is inserted into said marker mount and said retaining sleeve moves to the locked position.
36. The apparatus as defined in claim 35, wherein said means for said coupler holding said feed neck immobile comprises a plurality of cavities in said feed neck, a plurality of bores in said marker mount said bores adapted to align to said cavities, a plurality of spheres each of said spheres placed in each bore wherein said spheres are forced into said cavities if said cavities are aligned with said bores and said retaining sleeve moves to the locked position.

37. The apparatus as defined in claim 36, wherein the number of positions where said paintball hopper is held immobile is limited to the positions where said bores align with said cavities.
38. The apparatus as defined in claim 37, wherein said retaining sleeve moves axially between the locked and unlocked positions.
39. The apparatus as defined in claim 37, wherein said retaining sleeve moves rotationally between the locked and unlocked positions.
40. The apparatus as defined in claim 34, wherein said means for coupling comprises a feed neck adapted to connect to said paintball hopper, a marker mount adapted to connect to said marker, said feed neck releaseably couples to said marker mount, and means for holding said feed neck immobile if said feed neck is inserted into said marker mount and moved to a locked position.
41. The apparatus as defined in claim 40, wherein said means for said coupler holding said feed neck immobile comprises a plurality of pins extending from said feed neck, a plurality of grooves in said marker mount adapted to align to each of said pins, said grooves having a locking portion, and means for holding each pin in said locking portion.
42. The apparatus as defined in claim 41, wherein said means for holding said pin in said locking portion comprises an o-ring.
43. The apparatus as defined in claim 41, wherein said means for holding said pin in said locking portion comprises an o-ring and a wave spring.

44. A method for manufacturing a coupler for releaseably coupling a variety of paintball hoppers to a variety of paintball markers, comprising:

manufacturing a plurality of feed necks, wherein each of said feed necks having the same outside diameter, the inside diameter adapted to couple to a specific paintball hopper, and the same means for being held in an immobile position, manufacturing a plurality of marker mounts each having a first and a second end, wherein said first end of each of said marker mounts having the same outside diameter, and the same inside diameter adapted to slidably accept the outside diameter of said feed necks, said second end of each of said marker mounts having the same outside diameter, and an inside diameter adapted to couple to a specific paintball marker, each of said marker mounts having means for holding said feed neck in an immobile position, manufacturing a plurality of retaining sleeves, wherein each of said retaining sleeves is adapted to slidably mount to said marker mounts, each of said retaining sleeves being movable between a locked and an unlocked position, and having the same means for being biased in a locked position.